

Message Text

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SUBJECT: SPACE AGREEMENT: MICROWAVE OBSERVATION EXPERIMENT
(04.02.00) - -
REF: MOSCOW 13408
FOR SCICOUN

1. PLEASE PASS THE FOLLOWING MESSAGE FROM DR. DAVID
JOHNSON, US CO-CHAIRMAN US/USSR WORKING GROUP ON SATELLITE
METEOROLOGY, TO HIS SOVIET COUNTERPART, DR. L. A.
ALEKSANDROV.

2. SEPTEMBER 21, 1977 (04.02.00)

DR. L. A. ALEKSANDROV
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HYDROMETEOROLOGICAL SERVICE OF THE USSR
12, PAVLIK MOROZOV STREET
MOSCOW, D-376, USSR

DEAR DR. ALEKSANDROV:

I AM WRITING CONCERNING THE FUTURE COURSE OF OUR MICROWAVE
OBSERVATION EXPERIMENT. AS YOU KNOW, THE EXPERIMENT COMES
UNDER A 1971 BILATERAL SPACE AGREEMENT THAT IS UP FOR
RENEWAL THIS YEAR. IN CORRESPONDENCE WITH THE SOVIET

ACADEMY IN CONNECTION WITH THIS RENEWAL, DR. LOVELACE, NASA DEPUTY ADMINISTRATOR, PROPOSED THAT WE SHOULD PROCEED WITH THE EXCHANGE AND EVALUATION OF 1976 AIRCRAFT AND SATELLITE OBSERVATION DATA, AND THAT WE SHOULD SUBSEQUENTLY DETERMINE WHETHER THE DATA WARRANT A CONTINUATION OF THE COOPERATIVE MICROWAVE EXPERIMENT. THE SOVIET ACADEMY AGREED THAT THE NEXT STEP WAS TO EXCHANGE AND EVALUATE THE 1976 DATA. UNDER THESE CIRCUMSTANCES, WE WISH TO DELAY COMPLETION AND FORMAL APPROVAL OF THE "IMPLEMENTATION PLAN FOR THE JOINT SOVIET-AMERICAN MICROWAVE EXPERIMENT (SAME) UNTIL AFTER THE 1976 DATA HAVE BEEN EXCHANGED AND EVALUATED.

THE NEXT STEP, THEN, IS TO PREPARE FOR THE EXCHANGE OF 1976 AIRCRAFT AND SUPPORTING SATELLITE DATA. TOWARD THIS END, WE HAVE RECENTLY COMPLETED THE PRELIMINARY PROCESSING OF OUR 1976 AIRCRAFT EXPEDITION RAW DATA TAPES. THESE PRELIMINARY RESULTS SHOW THAT A RECALIBRATION OF THE DATA SETS IS REQUIRED, TAKING MORE CAREFULLY INTO ACCOUNT TEMPERATURE VARIATIONS WITHIN THE MICROWAVE RADIOMETERS, AND ELIMINATING ABSOLUTE CALIBRATION OFFSETS BY REGRESSION ANALYSIS OF THE RADIOMETER AND SURFACE DATA. WHILE WE COULD PROCEED UNCLASSIFIED

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WITH THE EXCHANGE OF THE PRESENT DATA SETS, WE BELIEVE IT WOULD BE MORE USEFUL TO YOU IF WE WERE TO WAIT UNTIL AFTER OUR DATA SETS HAVE BEEN RECALIBRATED. THIS SHOULD BE COMPLETED IN OCTOBER.

WITH REGARD TO FORMAT AND QUANTITY OF 1976 AIRCRAFT AND SUPPORTING SATELLITE DATA TO BE EXCHANGED, DR. GLOERSEN HAS PREPARED THE ATTACHED STATEMENT WHICH PROVIDES OUR RECOMMENDATIONS AND COMMENTS ON THESE SUBJECTS.

IN ORDER TO IMPLEMENT THE PROPOSED DATA EXCHANGE AND EVALUATION, WE PROPOSE THE FOLLOWING STEPS:

1. AGREE ON DATA FORMAT AND QUANTITY BY EXCHANGE OF TELEGRAMS BY NOVEMBER 1, 1977 (SEE ENCLOSURE FOR US PROPOSAL).
2. SHIP DATA BY DECEMBER 1, 1977. ALL EXCHANGES OF DATA REFERRED TO HERE AND IN THE ENCLOSURE WOULD BE IMPLEMENTED SIMULTANEOUSLY BY BOTH SIDES AFTER THEY HAVE AGREED BY CORRESPONDENCE THAT BOTH ARE READY TO PROCEED WITH SUCH EXCHANGES.
3. COMPLETE DATA EVALUATIONS AND EXCHANGE IN WRITING RESULTS AND RECOMMENDATIONS REGARDING FUTURE COOPERATIVE ACTIVITY IN THIS AREA BY FEBRUARY 15, 1978.

WITH REGARD TO DR. STEPANENKO'S SUGGESTION FOR A MEETING

OF SPECIALISTS IN THE FALL IN THE US, WE BELIEVE THAT THE REQUIREMENT FOR SUCH A MEETING CAN BEST BE DETERMINED AFTER COMPLETION OF THE STEPS OUTLINED ABOVE. CONCERNING HIS PROPOSAL TO MODIFY THE SAME IMPLEMENTATION PLAN TO PROVIDE FOR INDEPENDENT PUBLICATION OF RESULTS UNDER CERTAIN CONTINGENCIES, WE WILL BE PREPARED TO ADDRESS THIS QUESTION AFTER AN AFFIRMATIVE DECISION TO PROCEED WITH THE NEXT PHASE OF THIS EXPERIMENT.. IN THE ABSENCE OF AN AGREED JOINT PLAN, WE PROPOSE THAT THE DATA EXCHANGED BE MADE UNCLASSIFIED

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AVAILABLE TO THE OTHER SIDE WITHOUT RESTRICTIONS, BUT

RECOGNIZING THE NORMAL PRACTICE OF GIVING THE DATA'S ORIGINATOR THE RIGHT TO FIRST PUBLICATION.

I TRUST THE ABOVE ADDRESSES THE ISSUES RAISED BY DR. STEPANENKO EARLIER AND BY YOU IN YOUR RECENT LETTER. I LOOK FORWARD TO LEARNING YOUR VIEWS ON THE STEPS AND PROCEDURES OUTLINED ABOVE AND HOPE THAT WE CAN REACH AGREEMENT BY CORRESPONDENCE SOON.

SINCERELY YOURS,

DAVID S. JOHNSON, DIRECTOR
NATIONAL ENVIRONMENTAL SATELLITE SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC
ADMINISTRATION

ENCLOSURE

ENCLOSURE:

US RECOMMENDATIONS AND COMMENTS ON FORMAT AND QUANTITY OF 1976 AIRCRAFT AND SUPPORTING SATELLITE MICROWAVE DATA TO BE EXCHANGED

AIRCRAFT DATA FORMAT

WHILE DIGITAL TAPE RECORDS OF THE DATA MIGHT ULTIMATELY BE DESIRABLE, TABULAR RECORDS (PRINTOUTS) WOULD BE PREFERABLE FOR AN INITIAL EVALUATION OF THE DATA. ALSO, THE DATA UNCLASSIFIED

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SHOULD BE ACCOMPANIED BY SOME PRELIMINARY INTERPRETATION, A STATEMENT ON METHODS OF CALIBRATION, AN ASSESSMENT OF STABILITY, SENSITIVITY AND ACCURACY, ETC., BY THE ORIGINA-

TING SIDE. IN OTHER WORDS, WE PROPOSE THE EXCHANGE OF PRELIMINARY "RESULTS" FROM THE 1976 AIRCRAFT MISSIONS, WHICH WE DEFINE AS SELECTED DATA SETS AND A PRELIMINARY ANALYSIS OF THOSE DATA. SOME GENERAL SUGGESTIONS AS TO THE NATURE OF THE INFORMATION TO BE EXCHANGED ARE CONTAINED IN THE DRAFT SAME "IMPLEMENTATION PLAN." BASED ON THIS EARLIER THINKING, WE SUGGEST THE SPECIFIC DATA ELEMENTS AND SUPPLEMENTAL INFORMATION ON THE DATA COLLECTION SYSTEM IN THE APPENDIX TO THIS ENCLOSURE.

IN GENERAL, IT IS OUR INTENTION TO APPLY REGRESSION ANALYSIS TO I1-18 DATA SETS IN ORDER TO ESTABLISH THE RELATIONSHIP BETWEEN MULTISPECTRAL BRIGHTNESS TEMPERATURES AND VARIOUS OCEAN/ATMOSPHERE PARAMETERS. SUCH ANALYSIS WOULD REQUIRE CAREFUL SPECIFICATION OF HOW THE VARIOUS PARAMETERS ARE MEASURED IN SITU, AND THE SENSITIVITY AND STABILITY OF THE VARIOUS INFRARED AND MICROWAVE RADIOMETERS. WE BELIEVE A GIVEN DATA RECORD SHOULD CONTAIN DATE AND TIME, THE SAME INTEGRATION PERIOD FOR ALL DATA VALUES, CALIBRATED BRIGHTNESS TEMPERATURES FOR ALL MICROWAVE RADIOMETER CHANNELS, OCEAN SURFACE TEMPERATURE (PREFERABLY FROM AN 11 MICROMETER RADIOMETER, AS WELL AS SHIP REPORTS), OCEAN NEAR-SURFACE WIND SPEEDS AT A SPECIFIED LEVEL (PREFERABLY OBTAINED AT LOW ALTITUDE, CA. 150 METERS, WITH THE I1-18 INERTIAL NAVIGATION SYSTEM AND SURFACE SHIP VERIFICATION), AND ESTIMATES OF OVERHEAD CLOUD AND LIQUID WATER AND ATMOSPHERIC WATER VAPOR ABOVE THE AIRCRAFT FLYING AT LOW LEVEL.

SUPPORTING SATELLITE DATA

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WITH REGARD TO THE RELATED EXCHANGE OF SUPPORTING SATELLITE DATA, WE WOULD LIKE TO BE MORE SPECIFIC ABOUT THE MATERIALS TO BE EXCHANGED, BASED ON OUR EXPERIENCE OVER THE PAST YEAR. WE UNDERSTAND THAT THE 8.0 CM RADIOMETER ON BOARD THE METEOR-25 SATELLITE WAS NOT OPERATING DURING OUR CV-990 AIRCRAFT EXPERIMENT. SINCE THE 1.3 CM CHANNEL IS OF SECONDARY INTEREST TO US, WE WOULD PREFER TO RECEIVE ONLY WHAT YOU CONSIDER TO BE IMPORTANT RESULTS OBTAINED ON THAT CHANNEL RATHER THAN THE CALIBRATED DATA SET ITSELF.

AS FOR THE 1976 I1-18/NIMBUS-5 AND -6 EXPERIMENTS, WE ARE IN A POSITION TO SUPPLY YOU WITH NIMBUS CALIBRATED BRIGHTNESS TEMPERATURE, WITHOUT ANALYSIS. WE CAN PROVIDE DATA AT LEAST FROM THE 1.55 CM WAVELENGTH IMAGER ONBOARD NIMBUS- UNFORTUNATELY, THE HORIZONTAL POLARIZATION CHANNEL OF THE 0.81 CM IMAGER ON NIMBUS-6 FAILED, SO OUR DATA FROM THAT RADIOMETER IS NOT AS COMPLETE AS WE HAD PLANNED. WE CAN PROVIDE SUCH NIMBUS DATA AS ARE AVAILABLE FOR THE TIME

PERIODS AND AREAS ALREADY SPECIFIED BY DR. STEPANENKO IN HIS MARCH LETTER. THIS VOLUME COULD BE REDUCED IF THE EXACT TIMES AND TRACKS OF THE 11-18 FLIGHTS WERE PROVIDED.'

DATA QUANTITY

WITH REGARD TO THE QUANTITY OF DATA TO BE EXCHANGED, WE PROPOSE THAT IT BE LIMITED TO ESSENTIALLY EQUAL PERIODS OF OBSERVATION CONSIDERED TO BE OF GREATEST INTEREST BY BOTH SIDES. THIS WILL HELP TO KEEP THE AMOUNT OF MATERIAL EXCHANGED WITHIN REASONABLE BOUNDS. OUT OF THE APPROXIMATELY THIRTY-SIX HOURS OF CV-990 AIRCRAFT DATA, CORRESPONDING TO ALL OF OUR FLIGHT PATHS OVER OPEN WATER, WE EXPECT TO SELECT LESS THAN FIFTEEN HOURS OF SCIENTIFICALLY INTEREST-
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ING OBSERVATIONS. IN PRINTOUT FORM, THE MAXIMUM AMOUNT OF USEFUL DATA FROM THE CV-990 FLIGHTS WOULD NOT BE THICKER THAN 40 CM, AND FOR NIMBUS-5 AND -6, 3 CM. IF IT IS AGREEABLE, WE PLAN TO SUPPLY THESE PRINTOUTS RECORDED ON 35 MM PHOTOGRAPHIC FILM. WE WOULD APPRECIATE RECEIVING A SIMILAR AMOUNT OF DATA FROM YOU IN EITHER PRINTOUT FORM OR ON 35 MM FILM.

APPENDIX:

SUGGESTED DATA ELEMENTS AND SUPPLEMENTAL INFORMATION ON THE DATA COLLECTION SYSTEM

DATA ELEMENTS

TABLE COLUMNS SHOULD INCLUDE THE FOLLOWING FOR EACH PROCESSED DATA POINT:

1. DATE
2. GMT
3. LATITUDE AND LONGITUDE
4. AIRCRAFT ALTITUDE
5. AIRCRAFT ROLL AND PITCH ANGLES
6. DIRECTION OF AIRCRAFT FLIGHT LINE
7. GROUND SPEED OF AIRCRAFT
8. WIND SPEED AND DIRECTION
9. OCEAN SURFACE TEMPERATURE (FROM A THERMAL INFRARED
---- RADIOMETER)
10. CALIBRATED NADIR BRIGHTNESS TEMPERATURES (FROM ALL
---- DOWNWARD-VIEWING MICROWAVE RADIOMETER CHANNELS,
---- IDENTIFIED AS TO WAVELENGTH AND POLARIZATION)
11. CALIBRATED ZENITH BRIGHTNESS TEMPERATURES (FROM
---- ZENITH-VIEWING MICROWAVE RADIOMETERS, IF AVAILABLE)
12. VISUAL OBSERVATIONS OF CLOUD AND OCEAN SURFACE
---- CONDITIONS

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SUPPLEMENTAL INFORMATION ON THE DATA COLLECTION SYSTEM

THE FOLLOWING INFORMATION SHOULD BE PROVIDED:

1. RECORDING RATE ON THE RAW DATA TAPE (SAMPLES/SECOND)
2. TIME CONSTANT, OR AVERAGING TIME, OF INSTRUMENT(SECS)
3. INTEGRATION TIME OF PRECESSED DATA (SAMPLES/SECOND)
4. INSTRUMENT CALIBRATION SCHEME
5. DEMONSTRATED INSTRUMENT SENSITIVITY, STABILITY AND
----- ABSOLUTE CALIBRATION
6. INSTRUMENT INTERNAL CALIBRATION REFERENCE TECHNIQUE
7. VIEWING ANGLES OF ALL INSTRUMENTS
8. COMPENSATION SCHEME FOR TEMPERATURE VARIATIONS OF
----- LOSSY COMPONENTS WITHIN THE INSTRUMENT (INCLUDING
----- RADOMES, ANTENNAE AND WAVEGUIDES)

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